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Product:	**Amplifier**
Description:	**Service Manual**

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SERVICE MANUAL

2G12A

VIBRATION TECHNOLOGY LTD.

SERVICE INSTRUCTIONS

All VT amplifiers are modular in construction. The front panels contain preamplifier circuitry - the rear panel being the power module. Each panel is attached by four # 10 machine screws. The preamplifier sections can be removed readily , but to remove the power module requires that the preamplifier panels be removed first.

On the self contained units 2G12A , 4G10A the speaker wires and harness must be unplugged and the harness clip released before the power module can be removed.

On the EQ 140 and VR 140 the mains cord and harness must be unplugged first and the harness clip released before the power module can be removed. On the VR 140 , to remove the front panel , both the harness and the reverberation unit must be unplgged before the front panel can be removed.

Factory Adjustments

In some cases select-on-test resistors are used for factory adjustments. If certain components fail and are replaced , then further adjustment may require that these selected components be changed. The factory adjustments are listed as follows:

A. Quiescent current in output transistors.
B. Quiescent current in LED modulator for units with Vibrato or Tremolo.
C. 'Normal' gain adjustment on Slave amplifier SL 140.

Adjustment A

If ouput transistors are replaced , the following adjustments may be required.

On the PM 140 the quiescent current in the power transistors TR4 - TR7 is set at a maximum of 6 mA with a resistive load of 8 ohms and a supply voltage of 113 v rms. The value of resistors R22 , R23 is selected to give a voltage reading of 3 millivolts dc across the emitter resistors R24 - R27 of the output transistors.

In the case of the PM 60A , PM 60B the quiescent current in the power transistors TR4 & TR5 is set at 6 mA with loads of 8 ohms and 10 ohms respectively. With the supply voltage set at 113 v rms the value of resistors R22 , R23 is selected to give a voltage reading of 2 millivolts dc across the emitter resistors R24 , R25 of the output transistors.

Adjustment B

If any component in the LED modulator circuit is replaced , including the LED , then the current in the LED should be adjusted in the following manner.

The current in the LED is adjusted by selecting values for R36. These values are in the range 330 ohms - 750 ohms. With C12 disconnected

R36 is chosen for a LDR resistance of 50 kilohms ±10%. This measurement is done with the LDR's in darkness.

For the Tremolo circuit, R36 is chosen to give a LED current such that, with C12 disconnected, the overall gain of the reverb/tremolo section is unity.

Adjustment C

The gain of the SL 140 preamplifier is determined by R8. R8 is chosen to give unity gain with the gain control set at 5 ('Normal' setting). R8 is usually in the range 100k-220k.

TYPICAL FAULTS

Power Amplifiers

Apart from component failure which is rare, the fault most typical with the power modules is a blown fuse. A blown fuse can result from a shorted speaker cable or incorrect amplifier loading. No cabinets should be employed with an impedance of less than eight ohms.* After replacing a fuse always check the speaker cable.

A broken mica washer can cause a short circuit to ground on the output and driver transistors. In the case of the output transistors a fuse would blow. In the case of the driver transistor the amplifier could break into oscillation.

A failure in the power supply would cause a mains fuse to blow. F3 is a rear panel fuse and fuse F4 is wired internally in accordance with C.S.A. requirements. F3 is of a slightly lower value and usually blows before F4.

Preamplifier Modules

Preamplifier faults are rare, apart from control potentiometers which wear and are frequently subject to abuse. Component failure or defective solder joints causing noise can generally be isolated using a capacitor to ground signals at each stage. Loss of signal and loss of gain faults frequently show up in dc voltage checks. Charts of typical dc voltages follow.

VOLTAGE CHARTS

Tone Control Section 1.0

TEST POINT	METHOD	VOLTAGE
TR1 emitter	VTVM	14v
TR2 collector	25v range Avo 8	12v
TR2 emitter	25v range Avo 8	21.5v
TR3 emitter	VTVM	14v
TR4 collector	25v range Avo 8	12v
TR4 emitter	25v range Avo 8	21.5v
TR5 emitter	VTVM	14v
TR6 collector	25v range Avo 8	12v
TR6 emitter	25v range Avo 8	21.5v
TR7 emitter	VTVM	14v
TR8 collector	25v range Avo 8	12v
TR8 emitter	25v range Avo 8	21.5v

Reverb/Vibrato Section 2.0

TEST POINT	METHOD	VOLTAGE
TR2 emitter	25v range Avo 8	21v
Junction R7 , R10	25v range Avo 8	22.5v
TR3 collector	25v range Avo 8	8.6v
Junction R14 , R15	25v range Avo 8	15.4v
TR4 emitter	25v range Avo 8	12v
TR4 collector	25v range Avo 8	0 & 11.8v switching
TR5 & TR6 emitters	25v range Avo 8	4v -5.4v
TR8 emitter	2.5v range Avo 8	0.35v
TR9 emitter	VTVM	12.3v
TR10 collector	25v range Avo 8	10.4v
TR10 emitter	25v range Avo 8	23v

Reverb/Tremolo Section 3.0

TEST POINT	METHOD	VOLTAGE
TR2 emitter	25v range Avo 8	18.8v
Junction R7 , R10	25v range Avo 8	20.3v
TR3 collector	25v range Avo 8	8v
Junction R14 , R15	25v range Avo 8	14v
TR4 emitter	25v range Avo 8	12v
TR4 collector	25v range Avo 8	0 & 11.8v switching
TR5 & TR6 emitters	25v range Avo 8	4v - 5.4v
TR8 emitter	2.5v range Avo 8	0.3v
TR9 emitter	VTVM	11.5v
TR10 collector	25v range Avo 8	9.5v
TR10 emitter	25v range Avo 8	20.2v

VOLTAGE CHARTS

SL 140 Preamplifier Section

4.0

TEST POINT	METHOD	VOLTAGE
TR1 emitter	VTVM	14v
TR2 collector	25v range Avo 8	12.2v
TR2 emitter	25v range Avo 8	21.5v

PM 140 Power Module

5.0

TEST POINT	METHOD	VOLTAGE
TR1 base	10v range Avo 8	-0.7v
TR1 collector	25v range Avo 8	-4.1v
TR2 collector	100v range Avo 8	-33v
TR2 emitter	25v range Avo 8	-3.5v
Junction R3 , R4	100v range Avo 8	-25v
TR3 emitter	25v range Avo 8	-2.9v
Junction R8 , R13	100v range Avo 8	-46v
Voltage across CR3	25v range Avo 8	4.1v
Voltage across CR4	25v range Avo 8	4.1v
TR4 , TR6 emitters	100v range Avo 8	-56v
TR5 , TR7 collectors	100v range Avo 8	56v

PM 60A/B Power Modules

6.0

TEST POINT	METHOD	VOLTAGE
TR1 base	10v range Avo 8	-0.7v
TR1 collector	25v range Avo 8	-4.5v
TR2 collector	25v range Avo 8	-19v
TR2 emitter	25v range Avo 8	-3.9v
Junction R3 , R4	25v range Avo 8	-22.4v
TR3 emitter	25v range Avo 8	-3.2v
Junction R8 , R13	100v range Avo 8	-29v
Voltage across CR3	25v range Avo 8	4.1v
Voltage across CR4	25v range Avo 8	4.1v
TR4 emitter	100v range Avo 8	-37v
TR5 collector	100v range Avo 8	37v

Tone Control Section Parts List Dwg. No. 108/4

Resistors
½W 5% unless stated

R1	10k
R2	10k
R3	330k
R4	680k
R5	47k
R6	10k
R7	4.7k
R8	100k
R9	4.7k
R10	330k
R11	500k log pot
R12	2.2 M ½W 10%
R13	330k
R14	10k
R15	330k
R16	680k
R17	47k
R18	10k
R19	100k
R20	4.7k
R21	56k
R22	56k
R23	250k log pot
R24	5.6k
R25	2.2 M ½W 10%
R26	33k
R27	250k log pot
R28	10k
R29	330k
R30	680k
R31	47k
R32	25k/25k twin pot
R33	4.7k
R34	100k
R35	180k
R36	10k
R37	4.7k
R38	100k
R39	680k
R40	680k
R41	10k
R42	330k
R43	680k
R44	47k
R45	8.2k
R46	100k
R47	3.3k EQ 140, VR 140
R47	1.5k 2G12A, 4G10A
R48	4.7k
R49	330k
R50	1.5k EQ 140, VR 140
R50	750 ohm 2G12A, 4G10A
R51	2.2k 5W 10%
R52	2.7k EQ 140, VR 140
R52	1.2k 2G12A, 4G10A
R53	47K

Capacitors

C1	68	pf	500v	20%	
C2	22	mfd	25v		
C3	0.1	mfd	250v	10%	
C4	22	mfd	25v		
C5	0.01	mfd	250v	10%	
C6	0.1	mfd	250v	10%	
C7	0.022	mfd	250v	10%	
C8	0.01	mfd	250v	10%	
C9	68	pf	500v	20%	
C10	22	mfd	25v		
C11	220	pf	500v	20%	
C12	5000	pf	1000v	10%	
C13	22	mfd	25v		
C14	150	pf	500v	20%	
C15	0.015	mfd	250v	10%	EQ 140
C15	omitted on other models				
C16	0.1	mfd	250v	10%	
C17	100	mfd	25v/40v		
C18	5000	pf	1000v	10%	
C19	0.047	mfd	250v	10%	
C20	0.033	mfd	250v	10%	
C21	0.022	mfd	250v	10%	

Tone Control Section (Continued)

Capacitors

C22	470	mfd	40v	
C23	0.1	mfd	250v	10%
C24	1000	pf	1000v	10%
C25	0.01	mfd	250v	10%
C26	8200	pf	1000v	10%
C27	22	mfd	25v	
C28	22	mfd	25v	
C29	150	pf	500v	20%
C30	22	mfd	25v	
C31	0.1	mfd	250v	10%
C32	22	mfd	25v	
C33	22	mfd	25v	
C34	100	mfd	25v/40v	
C35	150	pf	500v	20%
C36	1000	pf	1000v	10%
C37	1	mfd	40v	

Semiconductors

CR1	1N 914
CR2	1N 914
TR1	BC 109 B
TR2	BC 179 B
TR3	BC 109 B
TR4	BC 179 B
TR5	BC 109 B
TR6	BC 179 B
TR7	BC 109 B
TR8	BC 179 B
LED	NSL 100

Reverb and Vibrato Section Parts List Dwg. No. 109/4

Resistors
½W 5% unless stated

R1	47k	R42	100k
R2	33k	R43	4.7k
R3	470k	R44	820 ohm VR 140
R4	15k	R44	510 ohm 2G12A
R5	22k	R45	1k VR 140
R6	47k	R45	330 ohm 2G12A
R7	4.7k	R46	
R8	2.2k	R47	100k
R9		R48	100k
R10	100 ohm	R49	47k
R11	2.2k	R50	4.7k
R12	150k	R51	4.7k
R13	12k	R52	4.7k
R14	10k	R53	2.2 M ½W 10%
R15	12k	R54	LDR RPY 58 A
R16	820 ohm	R55	47k
R17	100 ohm	R56	4.7k
R18	25k lin pot	R57	2.2 M ½W 10%
R19	3.3k	R58	4.7k
R20	1.5k	R59	LDR RPY 58 A
R21	1.5k	R60	4.7k
R22	750 ohm	R61	47k
R23	10k	R62	4.7k
R24	1.5k	R63	2.2 M ½W 10%
R25	10k	R64	4.7k
R26	10k	R65	LDR RPY 58 A
R27	1k	R66	4.7k
R28	27k	R67	47k
R29	500k rev. log pot	R68	4.7k
R30	10k	R69	2.2 M ½W 10%
R31	2.2k 5W 5% VR 140	R70	4.7k
R31	1.2k 5W 5% 2G12A	R71	LDR RPY 58 A
R32	100k lin pot	R72	4.7k
R33	2.2 M ½W 10%	R73	33k
R34	300k	R74	100k
R35	330 ohm	R75	47k
R36	select on test	R76	4.7k
R37	10k	R77	47k
R38	470k	R78	47k
R39	680k	R79	330k
R40	47k	R80	4.7k VR 140
R41	47k	R80	2.2k 2G12A

Reverb and Vibrato Section (Continued)

Capacitors

C1	1	mfd	40v	
C2	47	mfd	25v	
C3	1	mfd	40v	
C4	0.01	mfd	250v	10%
C5	0.1	mfd	250v	10%
C6	100	mfd	10v	
C7	1	mfd	40v	
C8	3300	pf	1000v	10%
C9	470	mfd	40v	
C10	100	mfd	10v	
C11	10	mfd	25v/40v	
C12	47	mfd	10v	
C13	22	mfd	25v	
C14	0.1	mfd	250v	10%
C15	1	mfd	40v	
C16	1	mfd	40v	
C17	470	mfd	40v	
C18				
C19	0.1	mfd	250v	10%
C20	1	mfd	40v	
C21	1500	pf	1000v	10%
C22	1	mfd	40v	
C23	3300	pf	1000v	10%
C24	3300	pf	1000v	10%
C25	1	mfd	40v	
C26	5000	pf	1000v	10%
C27	1	mfd	40v	
C28	1	mfd	40v	
C29	100	mfd	25v/40v	VR 140
C29	220	mfd	25v	2G12A

CR1	1N 4742 A	Zener

TR1	BC 109 B
TR2	40406
TR3	BC 109 B
TR4	BC 179 B
TR5	BC 109 B
TR6	BC 109 B
TR7	BC 109 B
TR8	2N 5525
TR9	BC 109 B
TR10	BC 179 B
TR11	BC 109 B
TR12	BC 109 B
TR13	BC 179 B
TR14	BC 109 B
TR15	BC 179 B
TR16	BC 109 B
TR17	BC 179 B
TR18	BC 109 B

LED	NSL 5023

PM 60 A/B Power Module Parts List Dwg. No. 112/4/1

Resistors
½W 5% unless stated

R1	220k
R2	22k
R3	2.7k
R4	8.2k
R5	10 ohm
R6	22k
R7	27k
R8	2.2k
R9	1k
R10	22 ohm
R11	22 ohm
R12	1k
R13	100 ohm 5W 10%
R14	2.2 ohm
R15	47 ohm 5W 5%
R16	330 ohm 10W 5%
R17	2.2 ohm
R18	47 ohm 5W 5%
R19	330 ohm 10W 5%
R20	39 ohm
R21	12k
R22	Select on test
R23	Select on test
R24	0.33 ohm 5W 7%
R25	0.33 ohm 5W 7%
R28	40 ohm 5W 10%
R29	0.22 ohm 5W 7% PM 60 A
R29	0.33 ohm 5W 7% PM 60 B
R30	3.3k
R31	0.22 ohm 5W 7%
R32	47k

Capacitors

C1	0.1	mfd	250v	10%
C2	500	mfd	50v	
C3	47	mfd	25v	
C4	150	pf	500v	20%
C5	150	pf	500v	20%
C6	0.022	mfd	250v	10%
C7	1000	mfd	10v	
C8	1000	pf	1000v	10%
C9	0.047	mfd	400v	10%
C10	4000	mfd	60v	
C11	4000	mfd	60v	

Semiconductors

CR1	1N 4003	
CR2	1N 4003	
CR3	1N 4731 A	Zener
CR4	1N 4731 A	Zener
CR5	S 6320-2	Bridge Rect.
TR1	BC 179 B	
TR2	BC 177	
TR3	TIP 32 B	
TR4	2N 6254	
TR5	2N 6254	

Transformers

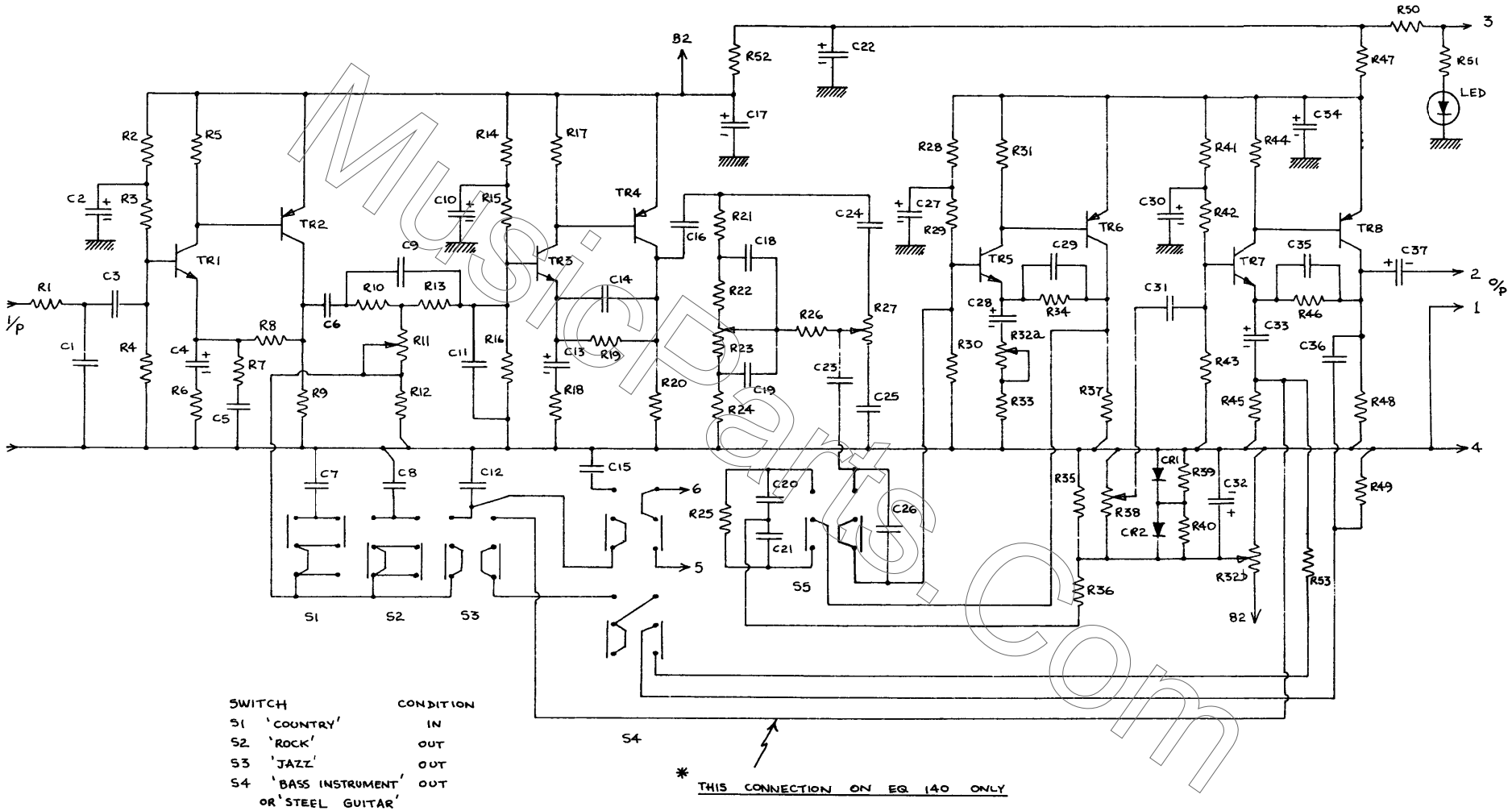
T1	2112-4047	Driver Tx.
T2	7113-4038	Mains Tx.

Fuses

F1	3A
F2	3A
F3	1.25A Slow-Blow
F4	1.5A Slow-Blow

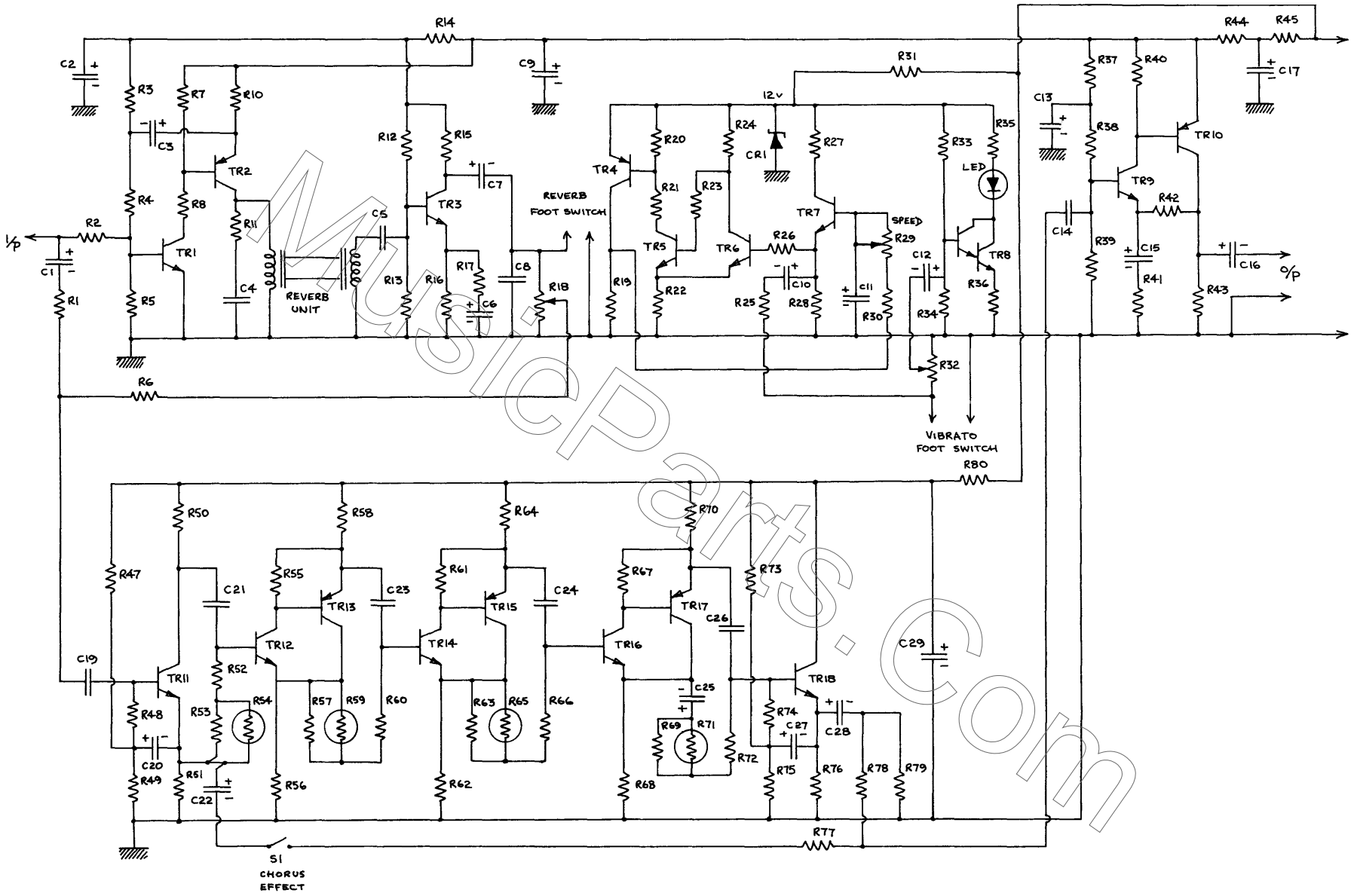
Misc.

S1	ZFL NE-15- U2 Mains Sw.
SK2	3 Pin Leviton Socket



SWITCH		CONDITION
S1	'COUNTRY'	IN
S2	'ROCK'	OUT
S3	'JAZZ'	OUT
S4	'BASS INSTRUMENT' OR 'STEEL GUITAR'	OUT
S5	'BASS EXPANDER'	OUT

DWG. NO.	108/4
TITLE	INSTRUMENT PREAMP
VIBRATION TECHNOLOGY	
DRAWN:	a. P. Ball Sept 1 '73



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VIBRATION TECHNOLOGY	
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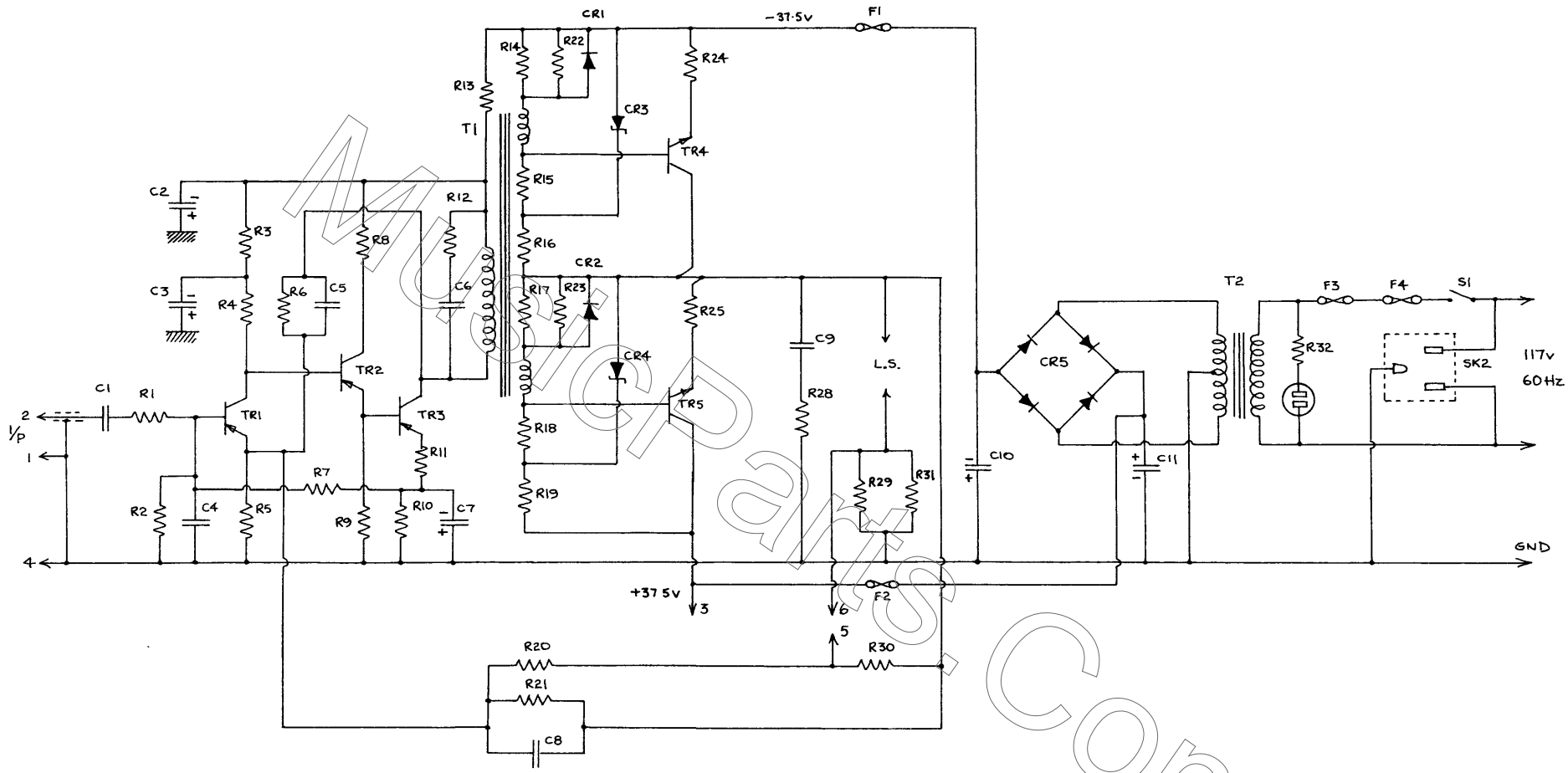

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TITLE	PM 60 POWER AMPLIFIER
VIBRATION TECHNOLOGY	
DRAWN:	A. P Ball. Sept 1'73